White Paper

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Project Director: Julie A. Solz

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Historic New England Haverhill Center Environment and Storage Project

Julie A. Solz

Historic New England

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In 2013, Historic New England received a $300,000 implementation grant from the National Endowment for the Humanities to support a major Collections Care Project at its collections storage facility in Haverhill, Massachusetts. The overarching goal of the $1,681,617 project was to ensure the preservation of the organization's nationally recognized decorative arts, textile, and personal artifacts collections by improving storage conditions and securing the building's exterior envelope.

This White Paper summarizes the goals and accomplishments achieved over the course of the grant period (January 1, 2014-December 31, 2016). Historic New England is deeply grateful to the National Endowment for the Humanities for providing core funding and to the Massachusetts Cultural Facilities Fund, Americana Foundation, Ruby W. and LaVon Parker Linn Foundation, and an anonymous funder for additional support.

Significance of the Collections and Need for the Grant

Historic New England maintains the most comprehensive and best-documented collection of New England decorative arts and household artifacts in the country, with more than 123,000 objects of historical and aesthetic significance that document life in New England over the course of four centuries. The collections are shared with the public at the organization's thirty-seven historic sites and through exhibitions, programs and tours, publications, study collections, and a growing online Collections Access database. The 65,000 objects not at the organization's historic properties are stored at the Haverhill Facility, an eight-story poured concrete structure built in 1912 to support the city's shoe-manufacturing industry (Figs. 1-2).

Fig. 1. Exterior view of the 1912 Haverhill Facility.

Fig. 2. Existing conditions in collections storage prior to the NEH award, showing inefficient fixed shelving that didn't protect the objects from dust.

Despite Historic New England's ongoing efforts to protect these collections, the century-old facility continued to present many preservation challenges. It is supplied with steam heat from a central boiler that is poorly equipped to service different heating zones. Wall insulation is minimal. Stand-alone humidifiers regulate the relative humidity but occasionally release too much moisture in the air, activating the fire alarm and resulting in condensation on the walls. It became increasingly clear to Historic New England that the conditions—wide seasonal fluctuations in temperature, very low wintertime humidity levels, and mold/mildew/excess moisture caused by water infiltration through the window openings—were unsustainable in the context of energy-efficient approaches to environmental control.

Project Objectives and Goals

The project objectives and goals grew out of a 2010 planning grant from the National Endowment for the Humanities that allowed Historic New England to develop a master plan for the Haverhill Facility and preliminary cost estimates for systematically and practically undertaking building repairs and system improvements to ensure the long-term preservation of the collections. The current project was designed to address the existing environmental problems, further Historic New England's campaign of sensitive building repairs and system upgrades to the Haverhill Facility, and help preserve approximately 22,000 objects so that these collections could continue to be shared with the public through loans, exhibitions, programs, collection tours, and installation at the organization's historic properties.

The specific objectives were as follows:

- Custom-design and construct one storage enclosure with insulated walls, equip it with an environmental control unit, and install 8,000 cubic feet of high-density storage equipment;
- Clean, dust, document, rehouse, move, inventory, and photograph approximately 22,000 objects;
- Secure the building's exterior envelope adjacent to the new storage enclosure by making necessary repairs and replacing/repairing windows; and
- Complete electrical, lighting, and fire detection updates as required.

All objectives were met. The storage enclosure, developed by Historic New England in collaboration with outside specialists, was designed to ensure consistent environmental conditions, conserve energy costs, make the objects more readily accessible to the public, and be a space-saving model for collections storage that could be shared with other cultural organizations and replicated for the remaining 43,000 objects and 150,000 archival items currently stored in the Haverhill Facility.

Project Activities

The project began with logistic planning in the spring of 2014, following Section 106 review and compliance. The assistant registrar and two collections care specialist positions were posted, the temporary shelving and HVAC equipment was ordered for temporary storage, and an inventory schedule was developed. Full project implementation began on July 1, 2014 with staff training and the first objects moved to temporary storage.

Stage One: Preparation

- Hired project staff (American Foundation Assistant Registrar and two Collection Care Specialists) and provided specialized training;
- Prepared temporary storage including installation of new and relocated shelving units, air conditioners, security system and data lines (wireless and cable) for access to network and collection database; and
- Inventoried and moved 21,042 objects to temporary storage (Figs. 3-13):
    - Resolved cataloguing and accession issues;
    - Tagged objects with condition issues requiring conservation treatment;
    - Attached paper tag and printed label to all objects to facilitate move and tracking;
    - Placed the objects securely in their temporary locations;
    - Segregated objects needing examination and stabilization by conservation team—30 objects immediately treated and stabilized; an additional 30 awaiting treatment;
    - Coordinated multiple ceramic and glass cleaning events with staff, guides, and volunteers; more than 4,000 objects were cleaned in preparation for photography and storage;
    - Digitally photographed more than 8,300 objects;
    - Updated approximately 9,800 object records and made all of the new content available to the public through the organization's Collections Access web portal (as of March 31, 2017, 94,334 object records were available; 41% of these included images); and
    - Finalized construction documents and submitted the RFP to construction vendors.

Fig. 3. The existing conditions in collections storage at the beginning of the project.

Fig. 4. Collection Care Specialists tagging objects as they moved the collections to temporary storage.

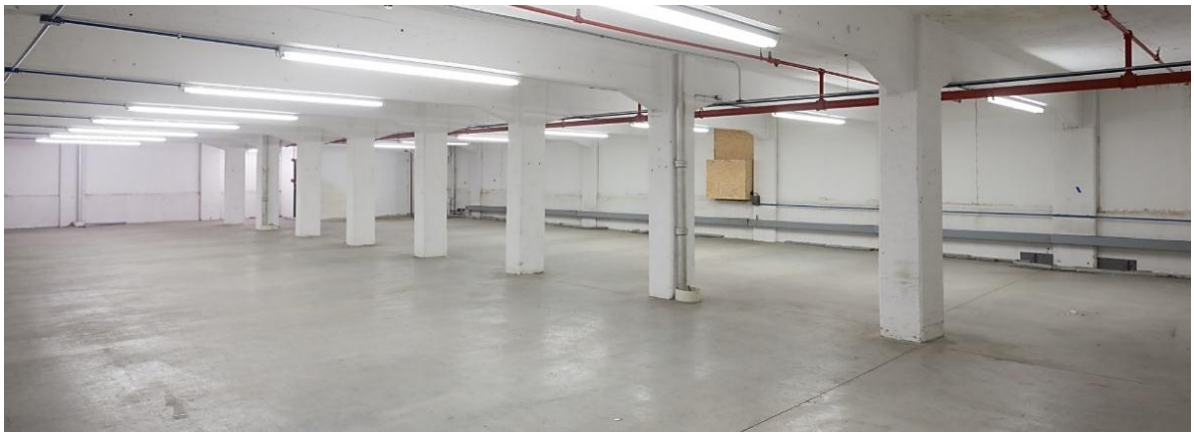


Fig. 5. The collections storage area after all objects and storage shelving had been removed.

Fig. 6. Temporary storage.

Fig. 7. The Collections Care team supervising staff, guides, and volunteers as they cleaned more than 4,000 pieces of ceramics and glass.

Figs. 8-9. Two temporary setups for photographing the collections.
Left: shadow box for small objects; Right: backdrop for oversize objects.

Fig. 10. Editing metadata for a ceramic object in Adobe Lightroom.

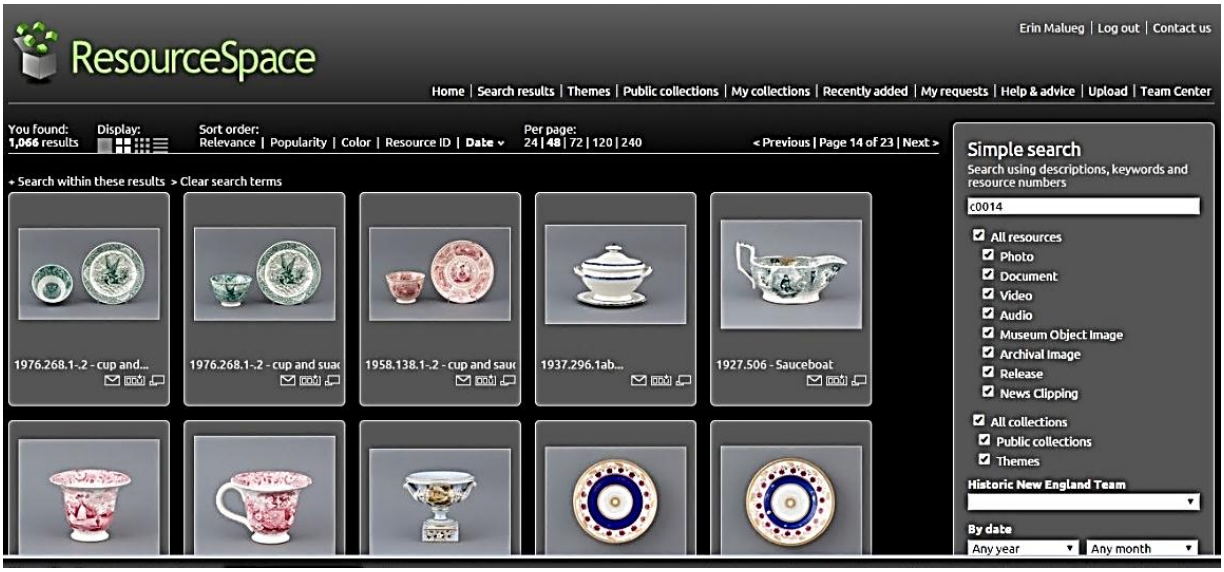


Fig. 11. Uploading images to ResourceSpace (Historic New England's digital asset management system), where they are linked to individual object records in Minisis (Historic New England's collection management database).

Figs. 12-13. Updating catalogue records and making records accessible via Historic New England's Collection Access web portal.

Stage Two: Construction

Stage Two took considerably longer than anticipated. The original timeline called for construction of the custom-designed storage enclosure, replacement/repair/infilling of the windows adjacent to the storage enclosure, and repair of the exterior concrete façade to take place concurrently, between January 2015 and May 2015.

The starting date for construction of the storage enclosure was delayed for several months owing to back-ordered fixtures and equipment, revisions to the mechanical system drawings, and scheduling conflicts relating to the new electrical panels. Nevertheless, Historic New England

was able to finish the enclosure in October 2015 and complete almost all other construction components by the end of the grant period. The work included:

- Construction of a temporary security wall to protect adjacent collections (Fig. 14);
- Construction of the storage enclosure (installation of steel framing thirty inches in from the exterior building walls, insulation, application of four layers of 5/8" dry wall [two on each side of the framing], painting of the interior, and installation of LED light fixtures) (Fig. 15);
- Repositioning of the sprinkler-system heads;
- Installation of a Liebert HVAC system, including all new duct work, coring of holes in the rear stairway to connect the units to the new rooftop condensers, related electrical upgrades, installation of the new rooftop condensers, and connection of all units (Figs. 16-17); and
- Testing of the new HVAC system and setting of the control levels.

Fig. 14. Temporary security wall.

Fig. 15. Storage enclosure under construction, following installation of the dry wall.

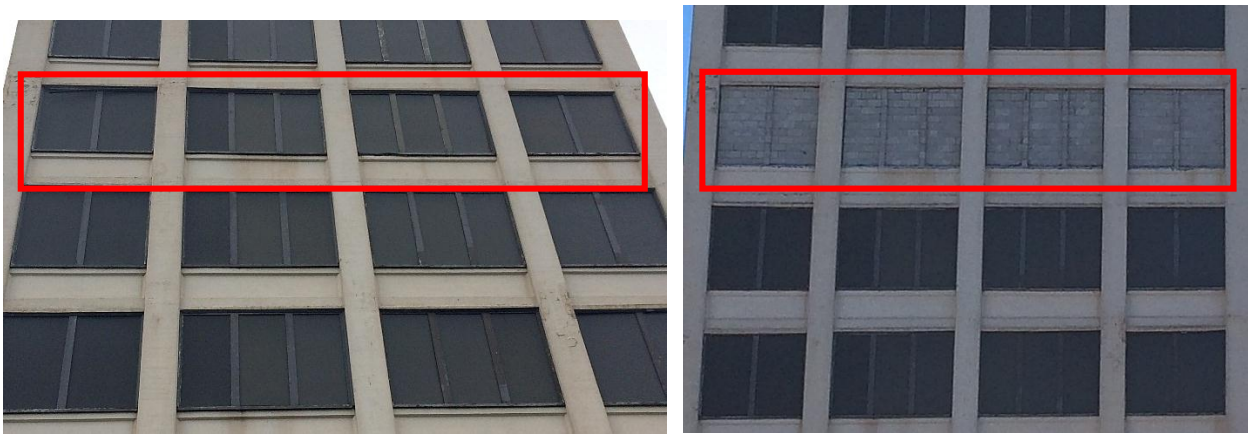
Fig. 16. One of the two new Liebert units.

Fig. 17. Rooftop condenser units.

Replacement/repair/infilling of the windows and repair of the exterior façade began in spring 2016 and was completed in March 2017. Historic New England and the Massachusetts State Historic Preservation Office (SHPO) discussed various window-treatment protocols for sealing the openings and preventing the infiltration of water, particulate matter, and light. At the time of

the grant application, Historic New England was exploring two options: 1) filling the window openings with concrete block and effectively securing the envelope by eliminating any potential failure points at joints or seams and 2) installing window blanks with improved flashing in the openings. It ultimately considered a third option in consideration of the building's historic value and aesthetic integrity as a contributing structure in the L.H. Hamel Leather Company Historic District: conserving the original wood windows, where they still existed, and replicating the wood frames and installing glass panes for windows that previous owners had boarded up or replaced with aluminum surrogates. This third option was chosen for the thirty-four windows on the east and west façades, the two most publicly-visible elevations (Figs. 18-19, 22-23). Historic New England and SHPO agreed that it was appropriate to fill the four window openings along the north (rear) façade with masonry block (Figs. 20-21). These windows are much less visible to the public and in a difficult-to-access location; filling the openings with masonry block will reduce the need for future maintenance. The final protocols included repairs, as needed, to the wood frames and new flashing to eliminate moisture issues, conservation of the wood sash, window reinstallation, and installation of new interior storms with a UV component.

Figs. 18-19. Row of windows on the east façade, adjacent to collections storage. Left: conditions prior to the NEH award; Right: conditions following treatment.



Figs. 20-21. Row of windows on the north façade, adjacent to collections storage. Left: conditions prior to the NEH award; Right: conditions following treatment.

Figs. 22-23. Row of windows on the west façade, adjacent to collections storage. Left: conditions prior to the NEH award; Right: conditions following treatment.

Stage Three: Installation and Reconfiguration

Stage Three began in July 2015 with the build-out and installation of the compact-storage cabinetry. The work included installation of the unit rails, raised flooring and tiles, and storage cabinetry on moveable undercarriages (Figs. 24-25). The team then carried out the following:

- Cleaned the new storage area and adjacent storage spaces to eliminate residual dust from the construction project, using Miele vacuums fitted with HEPA filters and dusting shelves as needed;
- Prepared the new cabinetry to receive the collections by lining the shelves and drawers with appropriate acid-free barriers including micro-foam, acid-free blue board, and acid-free and lignin-free blotter paper;
- Labeled all cabinets, drawers, and shelves following the proscribed location conventions for physical building spaces and units, as detailed in the collection management database;
- Decided against assigning barcodes and applying them to the shelving after encountering an issue with the functionality of the codes and the organization's database; the organization's IT team continues to investigate options for using this technology in the future;
- Safely moved a total of 25,948 objects (Figs. 26-29):
    - 20,656 objects from temporary storage into the new storage enclosure;
    - 386 oversized objects from temporary storage to other storage areas;
    - 4,906 objects from other storage areas into the new storage enclosure (rolled textiles, hanging textile cabinets, and jewelry)
- Rearranged the rest of the floor to accommodate new gifts and prepare new processing area; and
- Updated all object locations in the database.

Figs. 24-25. Left: Storage cabinetry being placed on moveable undercarriages; Right: Storage cabinetry with end caps attached.

Figs. 26-27. Project team working on jewelry trays.

Fig. 28. The new mobile storage cabinets with the rehoused objects in place.

Fig. 29. One of the twenty-four behind-the-scenes tours held during the week of June 20, 2016.

Stage Four: Lessons Learned and Evaluation

Historic New England learned a number of lessons during the course of the project. The team quickly realized that having the space and time to presort/organize the objects before putting them in their new locations was key to efficiently calculating the space needs and specific arrangement of the objects. The team also discovered that they could reuse the trays that they had made to house and move the small objects to temporary storage in the new storage units, saving both time and resources. They wished that they had taken greater care shelving objects in the temporary space and not mixing different object types, as this resulted in the need to "untangle" the intermingled objects when they were moved to the new storage units.

Organizations considering similar rehousing projects would be well served if they included a select number of interns on their team, provided that they can provide careful training and close supervision. Historic New England's project greatly benefited from strong groups of summer interns from Brown University, Tufts University, the University of New Hampshire, and Wellesley College. Each intern worked sixteen hours per week, helping to move the collections and fabricate storage trays for the extensive jewelry collection. With their assistance, the project was able to proceed more efficiently.

Historic New England will evaluate the project's success over the course of the next two years, as follows:

Infiltration of moisture and contaminants: The project will be judged a success if moisture no longer infiltrates into the building from the window openings and if there is a marked decrease in the amount of particulate matter on the collections, specifically concrete dust. Staff are monitoring the exterior walls for reduction or elimination of mold growth and for decreased particulate accumulation on storage units, shelves and objects.

Humidity and temperature stability/conditions improvement: An environmental data logger has been deployed in the new storage enclosure. The data readings are being compared to earlier readings for the space and to current readings outside the enclosure to determine how well this new enclosure and the HVAC system maintain the desired humidity and temperature range.

Energy efficiency: The new equipment will be monitored to determine actual run time and electrical use. Run time will help determine if the insulated environment is increasing the efficiency of the equipment. Energy efficiency will be harder to calculate, as the building systems are not conducive to measuring individual areas.

Cost effectiveness: Costs are being reviewed to determine Historic New England's total investment, whether there are additional cost savings that can be realized during the construction of future storage enclosures, and the degree to which the equipment is cost-effective to operate. The total project cost was $1,681,617 ($1,357,117 in operating costs plus $324,500 in fixed assets).

Historic New England is committed to the long-term preservation and presentation of its collections and is currently developing a new five-year strategic agenda. The discussion will

include priority needs, such as rehousing the remaining 43,000 objects in the artifact and fine art collections and 150,000 archival items.

Ongoing Public Relations and Audience Impact

Historic New England posted a total of forty-five *Inside the Collections Care Project* blog posts on its website (http://www.historicnewengland.org/about-us/whats-new/ topics/ Collections%20Care%20Project). A number of these were also posted on the organization's Facebook page. The project was featured in Historic New England's July 2014 newsletter and in the Summer 2014, Winter 2015, and Summer 2016 issues of *Historic New England* magazine. The latter article is included below (pp. 13-15).

The Collections Care Project team presented a session on the project entitled "If a Picture is Worth a Thousand Words, What do Museums Want to Say?" to a standing-room-only audience at the 2015 New England Museum Conference. Questions from the audience ranged from specifics of the project to Historic New England's broader collections management policies.

Historic New England celebrated the completion of the Collections Care Project through behind-the-scenes tours offered during the week of June 20, 2016. More than 200 museum colleagues, donors, members, and other interested individuals were hosted at twenty-four private and public tours. Local press and publicity was very positive. The Haverhill Facility and the organization's collections were featured in a segment on the community television channel (http://haverhillcommunitytv.org/video/ armenian-church-sale, starting at 6:24 minutes) and in an article in the *Eagle-Tribune*, which covers the Merrimack Valley of Massachusetts and southern New Hampshire (http://www.eagletribune.com/news/haverhill/city-hosts-new-england-history/ article_6ee71962-2cd9-5f70-9df6-842fca1ab3e6.html).

What Museum Storage Should Be

Celebrating the Completion of the Collections Care Project

After two years of moving, cleaning, cataloguing, photographing, and renovating, our Collections Care Project is complete. Introducing our newly upgraded home for the country's most comprehensive collection of New England decorative arts and household furnishings.

TOP **The decorative arts storage space before construction.**
BOTTOM **New high density mobile units showcase our Parian ware collection.**

FAR LEFT
An Abenaki birch bark wastebasket (1990.159.2).
NEAR LEFT
Collections Care Specialist JT Buzanga opens the storage units to show decorative glass.

One of my favorite parts of my job is spending time with collections in storage. I love being there on my own when it is quiet and still and it is just the objects and me. There are so many things to take in and discover. You don't need to know about the objects themselves—how they were made, when they were made, or by whom. You don't even need to know who owned them or how they came to Historic New England to appreciate the abundance of pattern, texture, and color. Clustered by form or function, on shelves or in drawers, they can take on new meanings and interest. I am always rediscovering objects and seeing some for the first time. I am always intrigued by the way they are juxtaposed against one another.

We hear again and again from researchers, students, interns, and members who are as fascinated by storage and the behind-the-scenes museum activities as I am. This is one of the reasons we are so excited about the completion of the Collections Care Project, our most recent and comprehensive endeavor to improve collections storage at our Haverhill, Massachusetts, facility.

For more than two years staff, interns, volunteers, contractors, vendors, and consultants have worked to transform our decorative arts storage unit into fresh, compact, and efficient storage with fully integrated climate-control systems. High-density, mobile storage units allow us to house more collections in a smaller footprint. The new storage improves conditions, is easy to maintain, and is flexible for the building and the collections. And we were able achieve this in our 104-year-old building without making significant changes to its exterior look and feel. We designed our project to be a prototype for improving storage in buildings not purpose-built to house collections or to sustain ideal climate control.

Beginning in the summer of 2014, we inventoried and examined more than 24,000 decorative art objects as we moved them to temporary storage. We checked and double-checked their accession numbers, reviewed and edited their object files and database records, and created new records for many previously uncatalogued objects. We cleaned and photographed thousands of objects, all of which are now accessible via our online Collections Access database.

ABOVE **Three mid-twentieth-century women's hats (1993.49, 1992.65, 1993.51). Glass bottle stoppers stored upright in a new polyethylene foam tray.**

NEAR RIGHT Twentieth-century jewelry stored in new custom trays. FAR RIGHT Rows of eighteenth-, nineteenth-, and twentieth-century shoes. BELOW Textile storage includes a photo tag identifying the quilt rolled inside.

After collections were relocated to temporary storage in early 2015, the work to transform the space began. We built a new pod—a room within a room—its walls set two feet away from the exterior building envelope. This created a service corridor to house ductwork for the HVAC system and a buffer zone around the pod to improve system efficiency. Next we installed mobile shelving units using both new and existing cabinets. More than half of the shelving was donated, which not only saved us a significant amount of money, but also supports our institutional environmental sustainability efforts by repurposing existing materials rather than purchasing new ones.

We moved all ceramics, glass, and silver back into the space and also added jewelry, rolled textiles, shoes, hats, and other accessories. Creative solutions for housing unusual objects such as glass bottle stoppers and custom-made mounts and supports for fragile objects like necklaces improve conditions for those objects. They are also now easier for staff and researchers to access, opening up more opportunities for scholarship and discovery. The last phase of the project, repairing the windows and patching the spalling concrete facade, will be completed this summer.

The response from donors, colleagues, and researchers who have seen the work in progress has been overwhelmingly positive. "Clean, accessible, well organized, and respectful of the objects—this is what museum storage should be," said Gerald W. R. Ward, Katharine Lane Weems Senior Curator of American Decorative Arts and Sculpture Emeritus at the Museum of Fine Arts, Boston.

Now we are ready to invite you to visit and see what we have been up to for these many months. Please join us for behind-the-scenes tours on June 23–25. We are eager to share our love of the collections that we put so much effort into preserving for future generations. And we hope that you too will see why spending time in collections storage is such a special way to experience these fascinating objects.

—Julie Solz
Team Leader, Collection Services

Collections Close-Up Tours
June 23–25
Join us for behind-the-scenes tours of our newly renovated collections storage facility. Find dates and times and sign up online at HistoricNewEngland.org.
Register soon; space is limited and tours fill up quickly.